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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,042	04/08/2004	Thomas C. Tiearney JR.	GEMS0239PA	3041

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EXAMINER	
KIKNADZE, IRAKLI	

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 09/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/709,042	TIEARNEY ET AL.
	Examiner	Art Unit
	Irakli Kiknadze	2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) *17-24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/8/2004*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *09021005* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-16, drawn to rotary x-ray anode, classified in class 378, subclass 144.

II. Claims 17-24, drawn to method of making an x-ray anode, classified in class 228, subclass 122.1.

2. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process as claimed can be used to make a materially different product such as joining of dense bodies of refractory metal such as tungsten or molybdenum to carbonaceous bodies to make graphite battery or energy storage cell, the product as claimed can be made by a materially different process such as low pressure plasma spraying (LPPS), chemical vapor deposition (CVD).

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with R. Vincent (Reg. No. 55,771) on September 6, 2005 a provisional election was made without traverse to prosecute the invention of I, claims 1-16. Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-24 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

5. Claims 28-20 and 22-24 are objected to because of the following informalities: these informalities have been discussed during a telephone conversation with applicant's attorney R. Vincent. It has been established that claims 18-20 should depend on claim 17 and claims 22-24 should depend on claim 21. Appropriate correction is required.

Further follows the examination of claims 1-16.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Lounsberry et al. (US Patent 4,573,185).

With respect to claims 1-5 and 16, Lounsberry teaches a lightweight rotating x-ray anode comprising (Fig. 1) a graphite substrate material (12); a refractory metal target material such as tungsten (18); a CTE material layer of rhenium (21) coupling the substrate material (12) to the target material (18) (column 3, lines 4-32).

8. Claims 1-5, 7, 8 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Truszkowska (US Patent 5,875,228).

With respect to claims 1-5, 7, 8 and 16, Truszkowska teaches a lightweight rotating x-ray anode comprising (Fig.2) a substrate material such as carbon-carbon composite fiber (20); a refractory metal target material such as tungsten alloy (22); a CTE material layer (24) coupling the substrate material (20) to the target material (22). The CTE material layer is layered sequentially from the substrate material and layered horizontally from the substrate surface (column 4, lines 15-37).

9. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Horner et al. (US Patent Application Publication No. US2003/0006269 A1).

With respect to claims 1-6, Truszkowska teaches a lightweight x-ray anode comprising a substrate material such as carbon-carbon composite fiber; a refractory metal target material such as tungsten alloy or molybdenum alloy; a CTE material layer coupling the substrate material to the target material ([0009];[0010]; [0015] and [0016]).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Truszkowska (US Patent 5,875,228).

12. With respect to claim 9, Truszkowska teaches claimed invention except the CTE material layer has an approximate coefficient of thermal expansion averaging between each of the adjacent materials. It would have been obvious to one of ordinary skill in art at the time the invention was made to use the CTE material having the approximate coefficient of thermal expansion averaging between each of the adjacent materials in the x-ray anode of Truszkovska, since such modification would to gradually relive the thermal expansion mismatch stress between carbonaceous material of the anode substrate and refractory metal of a focal track of the target.

13. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Truszkowska (US Patent 5,875,228) as applied to claim 1 above, and further in view of Horner et al. (US Patent Application Publication No. US2003/0006269 A1).

With respect to claim 6, Truszkovska teaches claimed invention except that the target material is a molybdenum alloy. Horner teaches an x-ray anode made from tungsten alloy or molybdenum alloy on graphite or a carbon-carbone composite support. These materials have great strength and are readily commercially available ([0019]). It would have been obvious to one of ordinary skill in art at the time the invention was made to employ Molybdenum alloy for equally alternative target material as suggested by Horner in the x-ray anode of apparatus Truszkovska, since such modification would providing the durable and readily commercially available x-ray target while not changing the scope of the invention.

14. Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horner et al. (US Patent Application Publication No. US2003/0006269 A1)

With respect to claims 10-13, Horner teaches that at room temperature, the CTE of tungsten is about $4.5x10^{-6}$/°C, the CTE of Molybdenum is about $5.43x10^{-6}$/°C and the CTE of a carbonaceous substrate is about $1x10^{-6}$/°C ([0016]). A layer of a material comprising a mixture of particles of a refractory metal boride and of a metal carbide, providing a layer with the coefficient of thermal expansion to form an intermediate barrier reliving the thermal expansion mismatch stress between carbonaceous material of the anode substrate and refractory metal of a focal track of the target ([0010]). It would have been obvious to one of ordinary skill in art at the time the invention was

made to employ the CTE material layers with differing coefficient of thermal expansion in the x-ray anode to gradually relive the thermal expansion mismatch stress between carbonaceous material of the anode substrate and refractory metal of a focal track of the target. Further, It would be obvious to use material having the specific differing coefficient of thermal expansion, such as $2x10^{-6}$/°C or $1x10^{-6}$/°C or less than $1x10^{-6}$/°C, as claimed in claims 11-13, to accommodate specific anode substrate/target material arrangement.

15. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horner et al. (US Patent Application Publication No. US2003/0006269 A1) applied to claim 1 above, and further in view of Lewis et al. (US Patent 6,395,220 B1).

With respect to claim 14 and 15, Horner teaches that the CTE material layer comprises tungsten, tungsten borides, tungsten carbides, molybdenum, molybdenum borides, and molybdenum carbides ([0010]) but fails to teach chopped carbon fiber. Lewis teaches chopped pitch fiber, wherein varying the coefficient of thermal expansion is achieved by altering the proportions of the carbon fiber material (column 2, lines 1-10). This invention using novel binder pitch provides a desirably lower transverse and longitudinal coefficient of thermal expansion than conventionally made graphite bodies (column 1, lines 5-11). It would have been obvious to one of ordinary skill in art at the time the invention was made to employ the CTE material layers with chopped carbon fiber in the x-ray anode to further relive the thermal expansion mismatch stress between

carbonaceous material of the anode substrate and refractory metal of a focal track of the target.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze
September 12, 2005
IK

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER